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THE FUTURE OF MINERALOGY IN AMERICA¹

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INTRODUCTION

This meeting is the culmination of repeated efforts extending over a period of more than one hundred years to band the mineralogists of America together and to maintain a journal devoted primarily to mineralogy and cognate sciences. Altho our colleagues in England and France organized over forty years ago, in 1876 and 1878, respectively, we were unable to do so until a year ago. The past year has been primarily one of adjustment and development and of bringing the need of such an organization more strongly to the attention of those interested. It has also been a period during which our ideas of what the society should be have become somewhat clarified. The progress made has been most gratifying. We are now a going concern with some very tangible assets, and there are already strong assurances of a most influential future. As retiring President, I desire to discuss briefly some of the more important phases in the development of mineralogy in America, and the various efforts made to organize a national society, and to found a journal; also to interpret, if possible, the function of mineralogy in our present day educational and scientific programs and to indicate some probable lines of future development.

THE PERIOD OF EARLY DEVELOPMENT, 1785-1850

The earliest published papers dealing with the mineralogy of America were apparently those which appeared in the *Memoirs of the American Academy of Arts and Sciences*, in 1785. These were followed two years later by what Merrill characterizes as

¹ Address of the retiring president, read at the Chicago Meeting of the Mineralogical Society of America, December 28, 1920.

the first work on American geology, altho its title was distinctly mineralogical. I refer to Schoepf's *Beitraege zur Mineralogischen Kenntniss von des Oestlichen Theils von Nord Amerika und seine Gebirge*, which was published in Germany.

An event of far reaching importance upon the development of our science was the appointment in 1802 of Benjamin Silliman as professor of chemistry, mineralogy, and so forth, in Yale University. This appears to have been the first college appointment for mineralogy in America. Silliman began his lectures at Yale in the fall of 1804, and two years later wrote a sketch of the *Mineralogy of New Haven*, which was published in 1810 in the *Transactions of the Connecticut Academy of Sciences*. In those days mineralogy and geology had not been sharply differentiated, and mineralogy was commonly used as the more comprehensive term. Accordingly, this contribution by Silliman is commonly recognized as the first attempt at a geological description of an American region. Mention may also be made here of the *Mineralogical Observations made in the Environs of Boston in 1807 and 1808*, by S. Godon, which were published in the *Memoirs of the American Academy of Arts and Sciences*.

Interest in the subject was increasing rapidly, so that in January 1810 Dr. Archibald Bruce established the *American Mineralogical Journal*, the first American publication designed primarily for mineralogists and geologists. He was a native of New York City, having been born there in February, 1777. Altho he was a physician by profession, Dr. Bruce was vitally interested in mineralogy. After completing his medical studies at the University of Edinburgh in 1800, he spent two years visiting important mineral localities and collections in England, France, Switzerland, and Italy, so that when he returned to New York in the fall of 1803 to take up the practice of medicine he brought with him a mineral collection of great value.

Dr. Bruce's biographer tells us that "the ruling passion in Dr. Bruce's mind was love of natural science and especially of mineralogy. Toward the study of this science, he produced in his own country a strong impulse, and he gave it no small degree of *éclat*. His cabinet, composed of very select and well characterized specimens; purchased by himself, or collected in his own pedestrian or other tours in Europe, or, in many instances, presented to him by distinguished mineralogists abroad; and both in its extent, and in relation to the then state of this country,

very valuable, soon became an object of much attention. That of the late B. B. Perkins, which, at about the same time, had been formed by Mr. Perkins in Europe, and imported by him into this country, was also placed in New York and both cabinets contributed more than any causes had ever done before to excite in the public mind an active interest in the science of mineralogy."

And further, "Dr. Bruce manifested a strong desire to aid in bringing to light the neglected mineral treasures of the United States. He soon became a focus of information on these subjects. Specimens were sent to him from many and distant parts of the country, both as donations and for his opinion respecting their nature. In relation to mineralogy he conversed, he corresponded extensively, both with Europe and America; he performed mineralogical tours; he sought out and encouraged the young mineralogists of his own country, and often expressed a wish to see a journal of American mineralogy upon the plan of that of the School of Mines at Paris. This object, as is well known, he accomplished, and in 1810, published the first number of this work. Owing to extraneous causes, it was never carried beyond one volume; but it demonstrated the possibility of sustaining such a work in the United States, and will always be mentioned in the history of American science, as the earliest original purely scientific journal in America."

It is to be sincerely regretted that the failing health and early death of Bruce caused this journal to be so short lived. Its continuation would have permitted the mineralogists of this country to have looked with pride upon the achievements of our early workers in this direction, for in Europe much progress in the founding of mineralogical journals had already been made. In France there was the *Journal des Mines*, founded in 1795, which became the *Annales des Mines* in 1816. In Germany the *Taschenbuch fuer die gesammte Mineralogie mit Hinsicht auf die neuesten Entdeckungen* was established in 1806, which subsequently was superseded by the *Zeitschrift fuer Mineralogie*. This journal in turn gave way to the *Jahrbuch fuer Mineralogie, Geognosie, Geologie, und Petrefaktenkunde* in 1830, which with but slight modifications in the title, has continued down to the present day and is recognized as a most powerful influence in the development of the earth-sciences, especially in Europe.

The first comprehensive work on mineralogy in America was Parker Cleaveland's *Elementary Treatise on Mineralogy and*

Geology, a volume of 668 pages with numerous crystal drawings and a colored geological map of the eastern portion of the United States, which appeared in 1816. In writing this text it obviously was necessary for Cleaveland, who was professor of mathematics and natural philosophy, and lecturer on chemistry and mineralogy in Bowdoin College, to which position he had been appointed in 1805, to draw freely upon European writers, especially English, French, and German. The incorporation of American localities was an arduous task, for Cleaveland indicates that Bruce's *Mineralogical Journal*, a paper by S. Godon in the *Memoirs of the American Academy*, and another by Dr. Adam Seybert, of Philadelphia, in the *Medical Museum*, were almost the only printed authorities which he employed.

In his introduction, Cleaveland stresses the importance of mineralogy in the following manner: "It may also be remarked that several arts and manufactures depend upon mineralogy for their existence; and that improvements and discoveries in the latter cannot fail of extending their beneficial efforts to the aforementioned employments. In fine the study of mineralogy, whether it be viewed as tending to increase individual wealth, to improve and multiply arts and manufactures and thus promote the public good; or as affording a pleasant subject for scientific research, recommends itself to the attention of the citizen and scholar." Also, "But whatever progress may hitherto have been made in mineralogical pursuits, every new advance has opened a wider and more interesting prospect. The science is still in its infancy, and in many of its paths can only proceed with a faltering and uncertain step."

In reviewing this pioneer text, Professor Silliman in 1818 said: "in our opinion, this work does honor to our country and will greatly promote the knowledge of mineralogy and geology, besides aiding in the great work of disseminating a taste for science generally. . . . The method of execution is masterly. Discrimination, perspicuity, judicious selection of characters and facts, a style chaste, manly, and comprehensive, are among the attributes of Professor Cleaveland's performance. . . . In our opinion, Professor Cleaveland's work ought to be introduced in all our schools of mineralogy and ought to be the travelling companion of every American mineralogist." The text was received with great favor, a second edition in two volumes being issued in 1822. Although later a third edition became

necessary, it was never prepared on account of the failing health of the author.

In 1825 Samuel Robinson published an elaborate list of American mineral localities, entitled *A Catalogue of American Minerals with their Localities*. The next year Emmons' *Manual of Mineralogy and Geology* was issued. This was a text of 230 pages. The part dealing with mineralogy was the second general treatise on mineralogy published in America. Little attention was given to crystallography. Descriptive mineralogy was emphasized and 297 minerals were described.

The next work on mineralogy by an American was the first part of the *Treatise on Mineralogy*, published in 1832, by Professor C. U. Shepard, who at that time was an assistant to Professor Silliman at Yale University. It was based on the work of Mohs and was a small volume of 256 pages. This was followed in 1835 by Part Two, consisting of two volumes of 630 pages. A second edition was published in 1844.

The year 1837 is memorable in the annals of American mineralogy on account of the publication in that year of Dana's *System of Mineralogy*. While this work, consisting of 580 pages, was based to a considerable extent on the writings of European mineralogists, notably Haüy, Mohs, and Naumann, it was not devoid of originality. This is especially true of the section on mathematical crystallography and of the elaborate classification of minerals based upon the systems in use in botany and zoology. As is well known, this system of classification gave way in the fourth edition, in 1854, to a chemical classification which has continued in quite general use down to the present time. Dana's *System of Mineralogy* was received with great favor, and the first edition was succeeded by others as follows: second, in 1844, third in 1850, fourth in 1854, and fifth in 1868. The last edition, which is the sixth, prepared by E. S. Dana in 1892, with its various appendixes, is the standard reference work the world over on descriptive mineralogy.

As already indicated, in 1810 Bruce founded *The American Mineralogical Journal* which was discontinued after the publication of but one volume. Although but short lived, it had demonstrated the great need of a strictly scientific journal. Consequently in 1817 Colonel George Gibbs, one of the most enthusiastic devotees of mineralogy and the possessor of perhaps

the largest and most notable mineral collection in America at that time, which was purchased by Yale University in 1825, suggested to Professor Benjamin Silliman that a general scientific journal be established. This led to the founding of the *American Journal of Science* in 1818 under the editorship of Silliman. While its scope was intended "to embrace the circle of the physical sciences and their application to the arts, and to every useful purpose," the *American Journal of Science* has from the beginning published most of the important contributions on mineralogical subjects by American writers.

The decade 1810 to 1820 is an extremely important one to us for during that period there were founded the *American Mineralogical Journal* and the *American Journal of Science*. There was also published Cleaveland's *Mineralogy*. However, it yet remains to call attention to the fact that in 1819 there was organized at Yale College the *American Geological Society*. Many of the members of this society can be characterized as mineralogists; among them were Gibbs, Silliman, Cleaveland, and Godon. This organization continued until 1828 when it went out of existence. During this period, however, it did much to stimulate American workers in geology and mineralogy.

This organization was followed in 1840 by the *Association of American Geologists*, which held its first meeting in Philadelphia on April 2, 1840. Meetings were held annually and in 1843 the *Transactions of the Association of American Geologists and Naturalists* appeared. However, in 1847 this organization became the *American Association for the Advancement of Science*. It is thus seen that the American Association, with which practically all the important scientific societies are now affiliated, was, according to Alexander Winchell "in its incipency a body of geologists, and its first constitution was prepared by geologists assembled in Boston, in 1847."

In the development of American higher education in the period prior to 1850, the fact must not be overlooked that no college or university considered itself adequately equipped unless it possessed a representative collection of minerals. Indeed in the case of some institutions mineral collections, or cabinets as they were commonly called, were usually among the first purchases authorized by the governing bodies of the institutions. Such was, for example, the case at the University of Michigan, which was founded on March 18, 1837, but was

not formally opened for instruction until 1841. In the meantime, however, the well selected mineral collection of Baron L. Lederer, of New York City, consisting of 2,600 specimens, mostly from foreign localities, was purchased. This admirable collection was moreover quickly augmented, so that when the University opened its doors to students a collection of approximately 5,000 entries was available.

It will also be recalled that in 1807 Yale University acquired the Perkins collection, and that in 1825 the Gibbs collection also became the property of that institution. In discussing the growth of mineralogy in this country from 1818 to 1918, Ford says, "There is no doubt but that the presence at this early date of this large and unusual mineral collection had a great influence upon the development of mineralogical science at Yale and in the country at large."

From the foregoing discussion it is quite obvious that mineralogy played a very important rôle in the development of higher education during the first half of the nineteenth century. It was one of the first sciences to find a place in the curricula of our colleges and universities. Its devotees founded the first general scientific journals, one of which has continued uninterruptedly up to the present time and is held in high esteem the world over. Mineralogists were also among the first to recognize the need and value of national organizations, and were important factors in the founding of our most general scientific society, the *American Association for the Advancement of Science*.

THE PERIOD OF EXPANSION, 1850-1900

The second half of the nineteenth century was a period of rapid development in higher education. Colleges and universities sprang up all over the United States in quick succession, especially in the mid and far west. It was also a period in which mineralogy and geology were applied practically on a very large scale by the federal and state surveys. The demand for competent geologists became very great, so that more emphasis was now placed upon geology than upon mineralogy by the institutions of higher learning. However, during the last two decades of the century the need of specialization became imperative and the number of scientifically trained mineralogists increased materially. It was during this period also that petrography

and economic geology began to be recognized as independent disciplines.

Not only did the expansion of our surveys and the development of our vast mineral resources, but also the fostering of graduate work by our older and larger universities, demand adequately trained specialists. It will be recalled that during the eighties and early nineties comparatively large numbers of Americans went to Europe, especially to Germany, to acquire the latest methods in petrography and mineralogy.

After the *Association of American Geologists and Naturalists* in 1847 voted to resolve that organization into the *American Association for the Advancement of Science*, geology participated along with other sciences in the activities of the Association, and with geography formed what is known as Section E. Altho at first the American Association served the interests of the geologists rather satisfactorily, nevertheless with the rapid growth of the Association the opportunities for meetings of a strictly scientific character became fewer and the need of a separate organization began to be felt. According to Alexander Winchell an independent organization was first openly agitated by the geologists assembled at the meeting of the *American Association* at Cincinnati in 1881. Altho a committee was appointed, which canvassed the situation and reported favorably upon the organization of a separate society and the establishment of a geological magazine, no definite action was taken at the next meeting.

However, this question continued to be considered quite regularly at successive annual meetings of the Association, and the publication of the *American Geologist* was begun in Minneapolis in January, 1888. Again on August 14, 1888, in Cleveland, it was resolved that the formation of an *American Geological Society* was desirable, and organization plans were made. The first meeting was held in Ithaca on December 27, 1889, with a membership of 137. This organization, officially known as the *Geological Society of America*, was from the beginning independent and in no way subordinate to the *American Association*. It at once became a great stimulus to American geology and has exerted profound influence upon its development.

During the last two decades of the nineteenth century the movement to band those interested in minerals together in local organizations manifested itself in several of our large cities.

Thus, in 1886 the *New York Mineralogical Club* was organized to "develop and maintain an interest in mineralogy, especially in the minerals and rocks of Manhattan Island, New York City, through collecting and the study and comparison of existing collections." The Club has been successful in stimulating interest in mineralogy in New York City and its environs. It has also acquired the Chamberlain collection of minerals which is at present deposited in the American Museum of Natural History. Reference must also be made to the fact that in 1892 what is now known as the *Philadelphia Mineralogical Society* was organized, its purpose being similar to that of the New York Club. From time to time similar organizations had been founded in other localities, all of which have done much to stimulate interest in minerals and especially in those of the region immediately surrounding the location of the society.

It was also during this period that a journal devoted to the interests of the lover of minerals was founded, in 1885, by Mr. Arthur Chamberlain. It was first called the *Exchangers' Monthly* but was subsequently changed to the *Mineralogists' Monthly*. In 1892 *Goldthwaite's Minerals* was published. For two years both of these publications were published but in 1894 they were merged into the *Mineral Collector*, which continued to appear regularly until March, 1909, when it was discontinued.

THE MODERN PERIOD, 1900-1920

The first two decades of the twentieth century have been a period of enormous development in higher education. Attendance upon our colleges and universities has increased by leaps and bounds. The physical plants of these institutions were greatly extended. The older departments of instruction were materially expanded by the giving of more advanced and specialized courses, and many new departments were added. Our graduate work developed rapidly. Even before the outbreak of the World War, fewer and fewer students each year found it necessary to go to Europe, as had been the custom during the nineteenth century, for they were now able to secure the instruction desired in our own universities. Indeed, this instruction could be obtained from equally competent men and in more modern laboratories with superior facilities than were to be found abroad. The many contributions by the various governmental bureaus,

and the establishment of the Geophysical Laboratory of the Carnegie Institution of Washington in 1907, gave a great impetus to many branches of science in America. Industrial corporations also recognized the imperative need of adequately equipped laboratories and competent investigators.

During this period, the development of science was indeed marvelous. This statement applies to no science more than it does to mineralogy, by which term we obviously include what may be readily interpreted as the broader field, namely crystallography. Moreover, it was during the war that the preëminent position of the United States in the production of minerals and mineral products, and the vastness of our mineral resources, were brought most forcibly to the attention of the general public. Mineralogical methods had to be resorted to in the solving of many special problems imposed by the war, when it became necessary for us to establish our scientific independence. Hence, at present the value of mineralogy is appreciated as never before. On account of its basic value in the training of the geologist, chemist, pharmacist, forester, mining engineer, ceramist, and many other specialized engineers and technologists, mineralogy has become in some of our larger and more progressive institutions what may be designated as a "service" science. Furthermore, it is no longer merely a descriptive science but by virtue of the development of many quantitative methods and especially as the result of the epoch-making discoveries in the field of crystal structure it is now an exact science of fundamental importance.

THE MINERALOGICAL SOCIETY OF AMERICA

During the first fifteen years of the existence of the *Geological Society of America*, comparatively few of its members were primarily interested in mineralogy. However, beginning with the latter half of the first decade of the twentieth century the number of professional mineralogists who became members of the society increased rapidly. This group, however, soon felt that aside from the social aspect of the meetings, the society offered them but little in their own field. Accordingly in January, 1913, Professor Alexander N. Winchell, of the University of Wisconsin, in a letter addressed to those especially interested in mineralogy and petrography, raised the question as to the

advisability of organizing a *National Association of Mineralogists and Petrographers*. The responses were, however, of such a character that a postponement of a separate organization was decided upon. This question, however, would not be downed, and it came up annually at the meetings of the *Geological Society of America*, so that finally at the Albany meeting, December, 1916, a small group, consisting of Phillips, Van Horn, Walker, Wherry, Whitlock, and the speaker, decided to launch an active campaign looking toward the formation of a *Mineralogical Society of America*. A circular letter, signed by the above named committee, was sent out to those most vitally interested and the replies received clearly indicated the great desirability of such an organization. However, the United States entered the World War in the following April, and consequently plans for organization were held in abeyance. But in the meantime there had been much correspondence among those taking a lively interest in the organization, and in the fall of 1919 the new society was again actively agitated. A call was issued for an organization meeting to be held at the time of the meeting of the *Geological Society of America* in Boston, and on December 30, 1919, a group of 28 mineralogists met in the Mineralogical Museum of Harvard University and organized the society under whose auspices we are meeting today. A provisional constitution was adopted and officers elected for the ensuing year.

At this meeting arrangements were made whereby the lists of charter fellows and members would remain open for one year. The question of affiliation with the *Geological Society of America* was discussed and it is indeed gratifying to know that during the year this has been accomplished. On December 20, the *Mineralogical Society* had 55 fellows and 126 members. There were in addition 139 subscribers to the *AMERICAN MINERALOGIST*, the publication of which was taken over by the society. The most enthusiastic advocates of an independent mineralogical society never expected that such widespread interest could be stimulated during the organization year.

THE AMERICAN MINERALOGIST

As already indicated, the *AMERICAN MINERALOGIST*, which had been founded in 1916 under the auspices of the Philadelphia Mineralogical Society, the New York Mineralogical Club, and

the Mineral Collectors' Association, became the JOURNAL OF THE MINERALOGICAL SOCIETY OF AMERICA under the editorship of one of the founders, Dr. Edgar T. Wherry. A board of associate editors was appointed by the council to assist Dr. Wherry. During the past year the Journal has appeared regularly, the earlier numbers being considerably larger in size than had previously been the case. However, on account of increased cost of paper and printing it was necessary to reduce the size of the later numbers. It is hoped that as a result of the general readjustment of prices the issuing of monthly numbers of from 24 to 32 pages each may soon become possible. The character which the JOURNAL shall assume needs to receive the serious consideration of the council, inasmuch as it must serve the widely divergent interests of several groups of members of the Society. We owe much to the energy, skill, and unselfish devotion of our editor, who is constantly striving to make the JOURNAL one of which American mineralogists may be justly proud. This, however, will require some little time and I trust that we may all be somewhat patient in this matter.

GENERAL OUTLOOK

As the result of a more general recognition of the basic importance of mineralogy in pure and applied science and in various branches of industry, and with a national society boasting of a membership which includes the progressive investigators and devotees of the subject, and with a well-established and widely recognized official monthly publication, the future of mineralogy in America is assured. The problems of really fundamental significance requiring a comprehensive knowledge of crystallography and mineralogy are indeed many. The applications of the methods and truths of our science are constantly increasing and if America is to assume leadership in this great field it can be most speedily and advantageously accomplished thru the friendly coöperation of the members of an organization such as this.

FIRST ANNUAL MEETING OF THE MINERALOGICAL SOCIETY OF AMERICA

The first annual meeting of the Mineralogical Society of America was held in Chicago, Illinois, in conjunction with the thirty-third annual meeting of the Geological Society of America. The Council of the Society met at lunch on Tuesday, December 28th, those present being: President Kraus, Vice-president Walker, Treasurer Peck, Editor Wherry, and Councilor Van Horn. Secretary Whitlock was unfortunately unable to be present, owing to illness; and Dr. Wherry acted as Secretary *pro tem*. The ballots for officers were counted, and the election of those proposed was found to be unanimous. It was announced that the Geological Society of America had voted in favor of affiliation with the Mineralogical Society. The plan adopted is that Fellows of the G. S. A. who so desire may become fellows of the M. S. A. upon payment to the latter society of the sum of \$2.00, the balance of the amount of this Society's dues to be made up by payment from the treasury of the G. S. A. (except in the case of life fellows, for whom only part of the balance would be paid). The Mineralogical Society, is authorized by its Council to publish in its JOURNAL the proceedings of the meetings, papers presented to it, and also any papers on mineralogical subjects which may be presented before the G. S. A., but which that Society does not wish to publish in its Bulletin and which space will permit.

The Constitution and By-Laws provisionally adopted at the organization meeting had been purposely left open to amendment by the Council, so that changes necessitated by such arrangements as the above affiliation with the G. S. A., etc., could be made, before final adoption. No changes were found necessary in the Constitution, but the By-Laws required a number of amendments. It was considered to be desirable, first, to simplify election to membership by requiring indorsement of the application only by the Secretary and Treasurer, to the effect that the candidate had paid his dues, instead of by fellows personally acquainted with the candidate, as is required in the case of election to fellowship. Next, a reduction in the amount required to be prepaid for life membership or fellowship in the case of those belonging to the affiliated Geological Society of America was indicated. A number of members having expressed privately to Councilors their feeling that members were not given an adequate share in the conduct of the Society by the provisional By-Laws, it was decided to permit members as well as fellows to vote for the officers of the Society. Finally, an article had to be inserted to specifically sanction affiliation with the Geological Society of America and other scientific organizations, and to arrange for representation upon the Councils of such societies. These changes have been incorporated in the final Constitution and By-Laws, which are printed in full below.

A number of other matters were considered by the Council at this and two or three subsequent meetings during the following two days, the most important of which are here listed. It was decided that a Committee on Nomenclature and Classification of Minerals should be appointed. Attention having been called to the burden which would be placed upon mineralogists in certain foreign countries who might desire to become members, by the unfavorable

rates of exchange, it was decided to adjust the cost of membership or fellowship in such a way that the Society and the member would share the loss equally. For 1921, with the franc at about 6½ cents, the dues for France and Belgium were fixed at 30 francs for members, and 50 francs for fellows.

MEETING OF THE SOCIETY

The stated meeting of the Society was called to order by President Kraus at about 9.45 A.M., Wednesday, December 29, 1920, in one of the class-rooms of Rosenwald Hall, University of Chicago. In the absence of Secretary Whitlock, Dr. Wherry was asked to act as Secretary. The chairman expressed the hope that the meeting might be to some extent informal, that those who so desired should feel at liberty to smoke, and that discussions of papers presented be actively participated in by everyone interested. Reports of officers were then called for, and the Treasurer presented his report, which is published in full below. Professors W. A. Tarr and A. L. Parsons were appointed a committee to audit the accounts of the Treasurer. The editor then presented his report, which is also printed below.

Professor T. L. Walker briefly addressed the Society on the subject of the desirability of arranging for exchanging of specimens among institutions, stating that the Royal Ontario Museum was ready to exchange Canadian minerals for those from other places. Professor W. S. Bayley then discussed the matter of back numbers of the *AMERICAN MINERALOGIST—JOURNAL OF THE MINERALOGICAL SOCIETY OF AMERICA*, pointing out that there was likely to be an increasing demand for these as the membership grew. The Treasurer, who has charge of the stock of back numbers, reported that while volumes 1 to 4 inclusive were practically exhausted, a considerable number of copies of all issues of volume 5 were on hand.

The results of the election of officers for the year 1921 were announced. The recommendation of the Council as to the appointment of a Committee on Nomenclature and Classification of Minerals was reported, and the Society voted to have this Committee consist of five members, to be appointed by the President.

Vice-President Walker then took the chair. President Kraus reported the favorable action taken by the Geological Society of America on the matter of affiliation, and presented the amendments to the provisional By-Laws thereby made necessary, as stated in the record of the Council meeting above. It was voted to accept the amendments as proposed, and to adopt the Constitution and By-Laws as thus amended. These are printed in full below; further amendments can be made only in accordance with the provisions definitely stated in the final articles.

The presidential address, "The future of mineralogy in America," was then read by retiring President Kraus. It is printed in full in this number.

The session was then declared open for the reading of papers by members of the Society; but it was necessary to change somewhat the order in which these were to be read, from that originally announced, in order to suit the convenience of members who had engagements elsewhere which would prevent their attendance at the times assigned, and to place toward the end those requiring a lantern. Dr. H. S. Washington, of the Geophysical Laboratory, Carnegie Institution of Washington, was called upon to present his three papers first:

(1) Aphthitalite from Kilauea (with H. E. Merwin); the discovery of this mineral (double sodium and potassium sulfate), on some lava at Kilauea was announced, analyses and optical properties being given. The refractive indices show a definite relation to the composition. (2) Some suggestive general mineral characters; the limited replaceability of sodium and potassium in minerals was pointed out, as shown for instance in the micas, which are almost wholly potassic, in contrast with the pyroxenes and amphiboles, in which the alkali metal, when one is present, is almost entirely sodium; the remarkable presence of blue colors for which no simple cause can be assigned in a number of minerals was referred to, the sodalite group, the iron-amphiboles, and iolite (cordierite) being good examples; and in the discussion the fact that native sodium may cause a blue color, as in some halite, was pointed out. (3) Augites from Vesuvius and Etna; the results of a number of analyses were announced, with a statement as to the molecules shown to be present by recalculation of the analyses.¹ At 12.30 P.M. the Society adjourned for lunch.

Upon the reconvening of the Society shortly after 2 P.M., the Auditing Committee reported that the accounts of the Treasurer had been examined and found to be correct. President Kraus then appointed the Committee on Nomenclature and Classification of minerals, as follows: Chairman, Professor Thomas L. Watson, University of Virginia; members, Mr. William F. Foshag, U. S. National Museum, Professor Austin F. Rogers, Leland Stanford, Jr., University, Professor Thomas L. Walker, Royal Ontario Museum of Mineralogy and Dr. Edgar T. Wherry, Editor of the Society's Journal. The reading of papers was then continued.

Professor W. A. Tarr, University of Missouri: Mineralogy of the tourmaline mine near Canyon City, Colorado; a series of minerals of pneumatolytic origin were described.

Mr. William F. Foshag, U. S. National Museum: paper No. (1), The origin of the colemanite deposits of California, was read by Dr. Wherry in absence of the author; it pointed out that the evidence indicates the colemanite deposits to have originated in the alteration of ulexite by downward-circulating waters. (2) (with Edgar T. Wherry): Hydrous talcs; the extra molecule of water present in some talcs escapes on heating without producing essential changes in the optical properties, and is believed to be held by electrostatic forces in layers parallel to the cleavage of the mineral.

Dr. George F. Kunz, of Tiffany and Company, New York City, then gave a paper on: The diamonds of Pike Co., Arkansas; announcing that diamonds are at present actually being produced in that State, and that a systematic and scientific exploration of the deposit is being undertaken. The papers on the program were then taken up, as follows:

Professor T. L. Walker, University of Toronto: (1) "Allemontite" from British Columbia; this material, tho forming fine specimens, is not homogeneous, and not an isomorphous mixture of the elements, as often considered, but consists of successive layers of arsenic and antimony. (2) Skutterudite from Cobalt, Ontario; some small brilliant crystals supposed to be smaltite

¹ This paper has subsequently been published, as follows: NOTE ON AUGITE FROM VESUVIUS AND ETNA. HENRY S. WASHINGTON and H. E. MERWIN. *Am. J. Sci.*, [4], 50 (1), 20-30, 1921.

prove on analysis to be isomorphous intergrowths of smaltite with a triarsenide, skutterudite.

Dr. Edgar T. Wherry, U. S. Bureau of Chemistry: (1) The non-existence of certain supposed cases of isomorphism; (a) among the mineral sulfides and sulfo-salts all the supposed instances of isomorphism between one atom of a bivalent element and two atoms of a univalent one (for instance Pb , Ag_2) have been found on mineragraphic examination to be cases of admixture; (b) in the plagioclase feldspars the isomorphism is not between (SiO_4) and (Si_3O_8) groups, but between $(\text{Al}_2\text{Si}_2\text{O}_8)$ and $(\text{AlSi}_3\text{O}_8)$, which should be borne in mind in interpreting the compositions of other silicates; and (c) as already noted by Dr. Washington, potassium and sodium are isomorphous only in unusual cases.

Mr. D. Foster Hewett, U. S. Geological Survey: Orientite, a new hydrous silicate of calcium and manganese from Cuba (with Earl V. Shannon); small orthorhombic crystals occurring in manganese deposits of hydrothermal origin at several places in Oriente province, Cuba, prove to represent a new hydrous silicate of calcium and manganic manganese, somewhat related to melanotekite and kentrolite, which is named after the locality.

Professor Otto von Schlichten, University of Cincinnati: A simple method of determining refractive indices of liquids with the microscope; a modification of the Smith method, in which a piece of slide glass is cut to fit into the slot provided for inserting the selenite plate, quartz wedge, etc., and a shallow concavity is ground in it; the liquid is placed in this concavity, covered with a piece of cover-slip, and the change in focus produced by this lens is measured; each microscope and lens system, (a low power objective giving the best results) is calibrated by means of a few liquids of known index, and a curve can then be drawn connecting focal change with index, from which the index of an unknown liquid can be read off with an accuracy of from 1 to 5 units in the third decimal place. The Society then moved into another room, in which a lantern was available, and the following papers were presented with the aid of slides:

Professor T. L. Walker: (1) The occurrence of cosalite in Ontario; minute needles prove on analysis to be cosalite; elongation is on the *b* axis, and several brachydomes new to the mineral are present.

(2) The crystal habit of orthoclase from Penticton, B. C.; well developed crystals several centimeters in diameter weather out of a porphyritic igneous rock; they are often twinned, on the several laws of the mineral, and the Carlsbad twins show some interesting relationships between size and frequency of certain habits.

Mr. E. Thomson, University of Toronto: A mineralographic study of "animikite" and "macfarlandite" from Silver Islet, Lake Superior; (with A. L. Parsons); these substances have proved to be mixtures of sulfides, arsenides, etc., showing some striking intergrowth relations, and resembling in certain respects the ores of Cobalt, Ontario.

Professor A. L. Parsons, University of Toronto: Calcite from Shangionah Island, Lake Superior; two generations of calcite are present, the earlier etched, the later dull on the surface but clear within; some peculiar forms are present, and the habit is regarded as representing that normal for calcite formed under surface conditions and at the temperature of the waters of Lake Superior.

Mr. C. B. Slawson, University of Michigan: A new simplified method for drawing crystals; by obtaining the analytical coördinates of face intersections, it is possible to prepare crystal drawings with ease and rapidity by the use of cross-section paper. The axial cross is first laid off on the paper, then the coördinates of each face intersection in turn are laid off, and by joining the points thus found with the ends of one or the other axis, the desired drawing is obtained.

The last paper presented was by Dr. Edgar T. Wherry, on The significance of crystal habit. It was pointed out that the acidity of solutions is often of considerable influence on crystal habit; calcium oxalate for example has been recently noted to become acicular in acid plant juices; the effect of parallel overgrowth of impurities in layers a few atoms or molecules thick in rendering the affected faces prominent was also pointed out, and the probability that this is the origin of the lamellar form of some calcite was suggested.

In the absence of their authors, the following papers were read by title: Professor A. S. Eakle, University of California: (1) Jurupaite, a new calcium-magnesium silicate from Crestmore, Cal.; (2) Further notes on eakleite. Professor Charles Palache, Harvard University: (1) Holdenite and cahnite, two new minerals from Franklin Furnace, N. J.; (2) Goldschmidt's interpretation of Miller indices as force symbols. Dr. Alfred C. Hawkins, Wilmington, Delaware: A hematite crystal from Manton, R. I. The meeting adjourned about 6 P.M.

These papers if so desired by their authors, will be published in the *AMERICAN MINERALOGIST* as soon as space permits. The manuscripts of several have already been submitted for this purpose.

No special dinner was arranged for the Mineralogical Society, but a number of the fellows took part in the Geological Society dinner, Wednesday evening, at the Chicago Beach Hotel. Professor Frank R. Van Horn spoke on behalf of the Mineralogical Society. Some of the mineralogists attended instead the American Association lecture by Professor R. W. Wood, on High-power fluorescence and phosphorescence.

On the morning of Thursday, December 29, the Society met informally to inspect some American-made apparatus which had been assembled. The chief object of interest was a two-circle goniometer designed and constructed by the Spencer Lens Company, of Buffalo, N. Y. This instrument is not provided with the devices for measuring the sizes of crystal faces and other attachments of the latest model developed by Professor Victor Goldschmidt but it has a number of advantageous features, notably as to ease of manipulation and of reading the circles. It is to be placed on the market during 1921.

There were also exhibited a precision pycnometer, made by the Empire Laboratory Supply Company of New York, suitable for the easy and accurate determination of specific gravities out to the 4th decimal place; a dropping bottle for refractive index liquids, supplied by the Arthur H. Thomas Company of Philadelphia; and a small nitrogen-filled tungsten "Mazda" incandescent electric lamp, with the filament coiled spirally to form a slender cylinder, giving an intense line of light well adapted for goniometer work and optical measurements.

The following twenty-six fellows and members of the Mineralogical Society attended the meetings (besides a number of visitors):

W. S. Bayley, University of Illinois	W. A. Tarr, University of Missouri
E. L. Bruce, Queen's University	E. Thompson, University of Toronto
J. P. Connolly, S. D. School of Mines	Frank R. Van Horn, Case School of Applied Science
A. R. Crook, Illinois State Museum	Otto von Schlichten, University of Cincinnati
H. V. Ellsworth, Geol. Survey Canada	A. J. Walcott, Bausch and Lomb Optical Company.
D. J. Fisher, University of Chicago	T. L. Walker, University of Toronto
D. Foster Hewett, U. S. Geological Survey	H. S. Washington, Geophysical Laboratory
Walter F. Hunt, University of Michigan	Thomas L. Watson, University of Virginia
Edward H. Kraus, University of Michigan	S. Weidman, University of Oklahoma
George F. Kunz, Tiffany and Company, N. Y.	Edgar T. Wherry, Bureau of Chemistry
A. L. Parsons, University of Toronto	Frank A. Wilder, North Holston, Virginia
Albert B. Peck, University of Michigan	A. N. Winchell, University of Wisconsin
Heinrich Ries, Cornell University	
Chester B. Slawson, University of Michigan	

REPORT OF THE SECRETARY FOR 1920

The Secretary herewith reports that approximately 62 fellows and 131 members joined the Society during the year 1920, and are accordingly entitled to charter fellowship and membership. The lists are printed in full on subsequent pages.

Respectfully submitted,

HERBERT P. WHITLOCK, *Secretary.*

REPORT OF THE TREASURER FOR 1920

TO THE COUNCIL OF THE MINERALOGICAL SOCIETY OF AMERICA:

The Treasurer herewith submits his report covering the interval between February 1, 1920 and November 30, 1920.

<i>Receipts</i>		<i>Expenditures</i>	
From AMERICAN MINERALOGIST.....	\$ 381.82	Printing JOURNAL.....	\$ 964.61
Dues and subscriptions	950.08	Stationery and office supplies.....	68.78
Advertising.....	219.96	Other printing.....	5.93
Sale back numbers and reprints.....	117.37	Postage.....	19.03
Miscellaneous, incl. gifts ...	23.16	Miscellaneous, incl. buying back numbers.....	22.90
	<u>1,692.39</u>		<u>1,081.25</u>
Cash in bank Nov. 30, 1920.....			611.14
			<u>1,692.39</u>

Since this is the first year of the Society no comparison of increase in membership over previous years can be made. It may be interesting to point out, however, that the number of paid up subscriptions on the books of

the AMERICAN MINERALOGIST December 31, 1919, was 267. The mailing list December 15, 1920, was as follows:

Fellows.....	48
Members.....	125
Subscriptions.....	130
Unpaid, for various reasons.....	17
	<u>320</u>

During the year 56 names were taken from the mailing list for failure to renew or become Fellows or Members of the Society. In view of this the net growth of the circulation is quite substantial.

Taking into consideration the usual difficulties attendant upon the launching of a new organization and the increased rates in the cost of printing the Journal which became effective May 1, 1920, one can not but feel that the future may be faced with confidence in a steady increase in membership, which in turn means a larger, better, and more useful Society and Journal.

Respectfully submitted,

ALBERT B. PECK, *Treasurer.*

REPORT OF THE EDITOR FOR 1920

The 1920 volume of the AMERICAN MINERALOGIST contained 212 pages of text and 85 pages of covers, advertisements, and indexes. The subject matter included may be roughly classed as follows:

Subject	Articles	Pages
New minerals: descriptions of new species, discussions of the status of old ones, etc.....	10	21
Localities: descriptions of famous mineral localities, announcements of new occurrences, etc.....	14	20½
Crystallographic methods: series of papers on the Goldschmidt two-circle method of measurement, also optical methods.....	24	101
Miscellaneous: descriptions of methods of developing mineral specimens, museum exhibits, etc.....	2	5
TOTAL ORIGINAL ARTICLES.....	<u>50</u>	
Proceedings of Societies.....	21	18
Personal notes and news, book reviews, etc.....	41	11½
Accounts of new minerals described elsewhere.....	20	9
Abstracts of crystallographic literature.....	60	14
Abstracts of mineralogic literature.....	71	12
TOTAL ABSTRACTS AND NEWS ITEMS.....	<u>213</u>	
Illustrations,.....	48	
Pages.....		<u>212</u>

Five new mineral species were described in this volume for the first time,—echellite, flagstaffite, higginsite, plazolite, and vonsenite; while two, guadalcazarite and sarcopside, heretofore regarded as varieties, were raised to specific rank.

It has been the desire of the editor to devote approximately equal space to articles of scientific or technical nature, on the one hand, and those of more

elementary or popular character, on the other. The decision to publish the series devoted to the Goldschmidt two-circle method led to an undue amount of space being allotted to the former type, but in the next volume it is hoped to return to the adopted plan. There has been neither difficulty in obtaining articles, nor, fortunately, necessity of refusing to publish articles submitted; altho the limitations of space imposed by the condition of our finances have led to a delay disagreeable to the editor as well as to authors. It is hoped, however, that in the coming volume, we will be able to publish with reasonable promptness all articles received, provided authors continue to favor us with brief, concise articles in moderate number, as in the past.

While the policy of publishing abstracts of every article of mineralogic or crystallographic character issued since the beginning of the year 1916 has been adhered to, lack of space has led to the temporary withholding of many abstracts from publication during the latter part of the year. It is proposed to print these early in the next volume, however. Two other journals containing abstracts of mineralogical articles were started during 1920, *Mineralogical Abstracts*, published as a supplement to the *Mineralogical Magazine* (Great Britain) and *Revue de Géologie et des sciences connexes* (Belgium). The compilers of these collections of abstracts have located a considerable number heretofore missed by us, which will be duly noted, giving proper credit. What might appear at first sight to be an undesirable duplication of effort—the publication of three more or less identical series of abstracts—is thus shown to have redeeming features. Moreover, very few people have access to more than one of these publications, so that no change in plan on the part of ours, at least, seems called for.

Respectfully submitted,

EDGAR T. WHERRY, *Editor*.

NOTES

On invitation of the Department of Geology and Mineralogy of Amherst College, the next annual meeting of the Mineralogical Society of America is to be held at Amherst, Massachusetts, in conjunction with that of the Geological Society of America and other affiliated societies. The exact date has not been fixed, but it will be on or about December 29th.

At the recent Chicago scientific meeting a new organization was started, the Society of Economic Geologists. This, like the Mineralogical Society of America, is to be closely affiliated with the Geological Society of America.

CONSTITUTION AND BY-LAWS OF THE MINERALOGICAL
SOCIETY OF AMERICA

CONSTITUTION

Article I.—Name

This Society shall be known as the Mineralogical Society of America.

Article II.—Object

The object of this Society shall be the advancement of mineralogy, crystallography, and allied sciences.

Article III.—Officers

The officers of the Society shall be a president, a vice-president, a treasurer, a secretary, and an editor, who shall be elected annually. There shall be an executive council consisting of the above officers, the retiring president, and four fellows at large, to be elected for terms of four years each.

Article IV.—Membership

Section 1. The general membership of the Society shall be composed of Fellows, Members, and Patrons. There may also be Correspondents.

Section 2. Fellows shall be persons who have published results of research in mineralogy, crystallography, or allied sciences, and who upon nomination by the council shall have been duly elected to fellowship in the Society.

Section 3. Members shall be persons not Fellows who are engaged or interested in mineralogy, crystallography, or allied sciences.

Section 4. Patrons shall be persons who have bestowed important favors upon the Society. Election to patronship carries with it the rights and privileges of Members.

Section 5. Fellows, Members, and Patrons shall be entitled to vote in the transaction of the regular business of the Society. Only Fellows are eligible to office in the Society.

Section 6. Correspondents shall be persons distinguished for their attainments in mineralogy, crystallography, or allied sciences and not resident in North America.

Article V.—Amendments

This constitution shall be amended when the proposed amendment is favored by four-fifths of all the Fellows voting upon it. A copy of the proposed amendment shall be mailed to the general membership of the Society at least thirty days before a vote is taken. Voting shall be by mail ballot.

BY-LAWS

I. Membership

Section 1. Eligibility. Any person who has, in the opinion of the Council, contributed materially to the advancement of mineralogy, crystallography, or allied sciences, shall be eligible to fellowship in the Society. Any person or corporation interested in mineralogy, crystallography, or allied sciences, shall be eligible to membership.

Section 2. Election. (a) *Fellows.* Nominations for fellowship must be made by two Fellows according to a form to be provided by the Council. One of these Fellows must be personally acquainted with the nominee and his qualifications. The Council will submit the nominations received by them, if approved, to a vote of the Fellows in the manner provided in the By-Laws. The result may be announced at any stated meeting, after which notice shall be sent to the elected. (b) *Members.* Nominations for membership must be made on blanks provided by the Council, and receive the endorsement of the Secretary and Treasurer of the Society.

Section 3. Termination. Membership in the Society may be terminated or the names of the members may be placed upon the inactive list by vote of the Council.

II. Dues

Section 1. No person shall be accepted as a Fellow of the Mineralogical Society of America unless he pay the dues for the year within three months after notification of his election. The annual dues for Fellows shall be five dollars (\$5), payable at or before the annual meeting in advance.

Section 2. The annual dues for Members shall be three dollars (\$3). No person shall be accepted as a Member unless he pay the dues for the year within three months after notification of his election. The annual dues shall be payable at or before the annual meeting in advance.

Section 3. An arrearage in payment of annual dues shall deprive a Fellow or Member of the privilege of taking part in the management of the Society and of receiving the publications of the Society. An arrearage continuing over two (2) years shall be construed as notification of withdrawal.

Section 4. A single prepayment of one hundred dollars (\$100) shall be accepted as commutation for life for either Fellows or Members. In the case of Fellows, who are also Fellows of the Geological Society of America, a single prepayment of fifty dollars (\$50) shall be accepted as commutation for life.

Section 5. Any person eligible under Article IV of the Constitution may be elected Patron upon the payment of one thousand dollars (\$1000) to the Society.

III. Duties of Officers

Section 1. Officers. The duties of the president, vice-president, treasurer, secretary, and editor of the Society shall be the usual ones performed by such officers.

Section 2. Executive Council. The Executive Council shall direct all affairs and activities of the Society not otherwise provided for by the Constitution, as well as perform those duties specifically assigned to it.

Section 3. Committees. The president shall appoint, with the approval of the Council, such committees as may further the objects of the Society, including a Board of Associate Editors. The treasurer, the secretary, the editor, and the chairmen of the various committees shall make formal reports to the Society at least once each year.

IV. *Election of Officers*

Nominations for office shall be made by the Council. The list shall be mailed to the general membership for its information at least three months before the annual meeting. Any five Fellows or Members may forward to the Secretary other nominations for any or all offices. All such nominations reaching the Secretary at least 40 days before the annual meeting shall be printed, together with the names of the nominators as special ballots. The regular and special ballots shall then be mailed to the general membership. The results shall be announced at the annual meeting, and the officers thus elected shall enter upon duty at the adjournment of the meeting.

V. *Publications*

The Society shall publish a Journal devoted to the advancement of mineralogy, crystallography, and allied sciences. The general membership of the Society shall be entitled to receive the Journal.

VI. *Affiliation with other Scientific Organizations.*

The Council shall have authority to arrange for affiliation with other scientific organizations and, as occasion may arise, to appoint Fellows to represent the Society on the Councils of such organizations. In the case of the Geological Society of America, the representative so appointed shall also be a Fellow of the Geological Society of America, and shall be recommended to the Council of said society for confirmation as one of its nominees for the vice-presidency.

VII. *Local Sections*

Local sections of the Society may be formed in any locality, with the advice and consent of the Council, for the purpose of holding meetings and promoting coöperation. The affairs of such local sections shall be entirely in their own hands.

VIII. *Meetings*

There shall be an annual meeting of the Society and such other meetings as may be called by the Council. The annual meeting shall be held, whenever practicable, at the same time and place as that of the Geological Society of America.

IX. *Revision of the By-Laws*

After recommendation by the Council, By-Laws may be enacted, amended, or suspended by a two-thirds vote, by ballot, of the general membership of the Society.

CHARTER FELLOWS OF THE MINERALOGICAL SOCIETY OF AMERICA¹

- Dr. Elliot Quincy Adams, Bureau of Chemistry, Washington, D. C.
Frederick Noel Ashcroft, M.A., * 37 Palace Court, Bayswater, London W 2.
Miss F. Bascom, Bryn Mawr College, Bryn Mawr, Pa.
Prof. William S. Bayley, University of Illinois, Urbana, Ill.
Dr. N. L. Bowen, Geophysical Laboratory, Carnegie Institution, Washington, D. C.
Oliver Bowles, Bureau of Mines, Washington, D. C.
Dr. E. L. Bruce, Queen's University, Kingston, Ontario.
Dr. Henry L. Buttgenbach, 439 Avenue Louise, Brussels, Belgium.
Frederick A. Canfield, Dover, N. J.
Robert W. Clark, 215 McBrayer Bldg., Okmulgie, Oklahoma.
Prof. Charles Wilford Cook, Ann Arbor, Michigan.
Prof. R. D. Crawford, 1050 Tenth Street, Boulder, Colorado.
Prof. E. S. Dana, Yale University, New Haven, Connecticut.
Prof. A. S. Eakle, University of California, Berkeley, California.
Dr. H. V. Ellsworth, Dept. of Mines, Geological Survey, Ottawa, Canada.
John Eyerman, The Griswold, 2844 Euclid Ave., Cleveland, Ohio.
Dr. Chas. R. Fettke, Carnegie Inst. of Technology, Pittsburgh, Pa.
Prof. W. E. Ford, Yale University, New Haven, Conn.
William Frederick Foshag, U. S. National Museum, Washington, D. C.
Samuel G. Gordon, 1900 Race Street, Philadelphia, Pa.
Prof. R. P. D. Graham, McGill University, Montreal, Canada.
Prof. Frank Nelson Guild, University of Arizona, Tucson, Arizona.
Dr. Alfred C. Hawkins, 421 S. Grant Ave., Wilmington, Del.
Prof. Arthur P. Honess, State College, Pa.
Dr. E. O. Hovey, American Museum of Natural History, N. Y.
Prof. W. F. Hunt, University of Michigan, Ann Arbor, Michigan.
Herbert Insley, Bureau of Mines, Pittsburgh, Pa.
Robert A. A. Johnston, Chief Div. Min. Canada Geol. Surv., Ottawa, Canada.
Mr. A. A. Klein, The Norton Co., Worcester, Mass.
Prof. Edward H. Kraus, University of Michigan, Ann Arbor, Michigan.
Dr. George F. Kunz, 409 Fifth Ave., New York City.
Prof. A. C. Lane, (Tufts College), 22 Arlington Street, Cambridge, Mass.
Dr. E. S. Larsen, Jr., U. S. Geological Survey, Washington, D. C.
Prof. J. V. Lewis, Rutgers College, New Brunswick, N. J.
Prof. G. D. Louderback, University of California, Berkeley, California.
Prof. L. McI. Luquer, Columbia University, New York.
Prof. William J. McCaughey, Ohio State University, Columbus, Ohio.

¹The lists of Fellows and Members are provisional only as a few of those here listed have not yet paid their dues, and it is possible that one or two who have paid have been omitted, thru oversight or accidental misplacing of the applications. Corrections to the lists will be published in subsequent numbers; and the officers of the Society will appreciate receiving information as to any errors in either names or addresses, any changes of address, etc., so that prompt correction can be made.

* Life Fellow.

- Prof. E. B. Mathews, Johns Hopkins University, Baltimore, Md.
 Dr. H. E. Merwin, Geophysical Lab., Carnegie Inst., Washington, D. C.
 Prof. E. S. Moore, State College, Pennsylvania.
 Prof. C. Palache, Harvard University, Cambridge, Massachusetts.
 Prof. A. L. Parsons, University of Toronto, Toronto, Canada.
 Prof. A. B. Peck, University of Michigan, Ann Arbor, Michigan.
 Prof. A. H. Phillips, Princeton University, Princeton, N. J.
 Miss Mary W. Porter, 27 Museum Road, Oxford, England.
 Prof. C. H. Richardson, Syracuse University, Syracuse, N. Y.
 Prof. A. F. Rogers, Leland Stanford Jr. University, California.
 Dr. Waldemar T. Schaller, U. S. Geological Survey, Washington, D. C.
 Earl V. Shannon, U. S. National Museum, Washington, D. C.
 Prof. W. A. Tarr, University of Missouri, Columbia, Mo.
 Prof. Ellis Thomson, University of Toronto, Toronto, Canada.
 Prof. Frank R. Van Horn,* Case School of Applied Science, Cleveland, Ohio.
 Prof. T. L. Walker, University of Toronto, Toronto, Canada.
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 Manitoba, Winnipeg, Canada.
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 Prof. T. L. Watson, University of Virginia, Charlottesville, Va.
 Dr. R. C. Wells, U. S. Geological Survey, Washington, D. C.
 Dr. Edgar T. Wherry, Bureau of Chemistry, Washington, D. C.
 H. P. Whitlock, American Museum of Natural History.
 Prof. A. N. Winchell, University of Wisconsin, Madison, Wis.
 Dr. F. E. Wright, Geophysical Lab., Carnegie Inst., Washington, D. C.
 Prof. Victor Ziegler, Colorado School of Mines, Golden, Colorado.

CHARTER MEMBERS OF THE MINERALOGICAL SOCIETY OF AMERICA

- Prof. Geo. I. Adams, Dept. of Geology, University, Alabama.
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* Life Fellow.

- Joseph P. Connolly, 905 Columbus Street, Rapid City, S. D.
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George L. English, Wards Nat. Science Est., Rochester, N. Y.
Oren F. Evans, Norman, Oklahoma.
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- William Harvey McNairn, 415 Brunswick Ave., Toronto, Canada.
- Dr. G. C. Mance, St. Lawrence University, Canton, N. Y.
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- Morrow C. Miller, 915 Oakland Ave., Ann Arbor, Michigan.
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- L. P. Morgan, U. S. Assay Office, New York.
- M. L. Morgenthau, 431 Hudson Street, N. Y. City.
- Edwin C. Mott, 51 Warburton Ave., Yonkers, N. Y.
- W. E. Mumford, Malleable Iron Fittings Co., Branford, Conn.
- Wm. M. Myers, c/o Iron Dyke Mines Co., Inc., Homestead, Ore.
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- Harry G. Ott, Spencer Lens Co., Buffalo, N. Y.
- C. H. Paige, Box 84, Cambridge, Mass.
- Prof. William E. Patten, Box 702, Amer. P. O., Shanghai, China.
- Harry S. Peck, 472 Broadway, Albany, N. Y.
- Arthur G. Pohndorf, 400 7th Street, Denver, Colorado.
- E. Poitevin, Geological Survey, Ottawa, Canada.
- Fred. J. Pope, 1061 North Broadway, Yonkers, N. Y.
- James F. Porter, 1085 Sheridan Road, Hubbard Woods, Ill.
- Louis Reamer, Box 175, Short Hills, N. J.
- L. S. Ramsdell, 29 West Street, Worcester, Mass.
- W. A. Roebling, * 191 West State Street, Trenton, N. J.
- John G. Rothermel, Wagner Free Institute, 17th Street and Montgomery Ave., Philadelphia, Pa.
- Hugh Rothstein, Vanadium, Colorado.
- Prof. Otto Von Schlichten, University of Cincinnati, Cincinnati, Ohio.
- Prof. Hyrum Schneider, 765 Harrison Ave., Salt Lake City, Utah.
- Miss Catherine Schroder, 152 Penn Street, Brooklyn, N. Y.
- Geo. E. Schulz, 400 Elm Ave., Calumet, Michigan.
- George S. Scott, 20 Nassau Street, New York City.
- Maurits W. Sensstius, Dept. of Min., Syracuse University, Syracuse, N. Y.
- H. C. Shafer, 205 Franklin Ave., Norristown, Pa.
- T. D. Shipton, Hanover, Ill.
- C. B. Slawson, Mineralogical Laboratory, Ann Arbor, Michigan.
- Sociedad Cientifica Antonio Alzate, Ex Volador, Mexico, D. F. Mexico.
- G. S. Stanton, 402 West 153 St. N. Y. City.
- G. M. Staplin, Gouverneur, N. Y.
- Harry W. Trudell, 2030 E. Madison St., Philadelphia, Pa.
- F. E. Turner, 175 North Street, Willimantic, Conn.

* Life Member.

- Miss Isabel H. Tuthill, Rocky Point, N. Y.
John F. Vanartsdalen, Willow Grove, Montgomery Co., Pa.
George Vaux, Jr., Gulph Road, Bryn Mawr, Pa.
M. Vonsen, Petaluma, California.
Albert J. Walcott, Bausch & Lomb. Opt. Co., Rochester, N. Y.
W. A. Waldschmidt, Rapid City, S. Dak.
P. Walther, 648 Wyoming Ave., Elizabeth, N. J.
Alfred Wandke, Geological Museum, Cambridge, Mass.
William J. Webb, 75 Buckingham Road, Yonkers, N. Y.
E. Weidhaas, 408 West 42nd St., N. Y. City.
Lewis G. Westgate, 124 Oak Hill Ave., Delaware, Ohio.
Edward Wigglesworth, Boston Society Natural History, 234 Berkley St., Boston, Mass.
Eugene Willcox, 2224 Hazel St., Butte, Mont.
Mrs. Franklin D. Williams, 24 Dean St. Taunton, Mass.
Herman L. Willig, 140 E. Vine St., Lancaster, Pa.
Ernest H. Wilson, 37 Forest Avenue, Caldwell, N. J.
Charles R. Winn, Box 577, Butte, Mont.
Joseph P. Wintringham, 153 Henry Street, Brooklyn, N. Y.
Mrs. Samuel C. (May G.) Witherspoon, 127 4th Street, Carney's Point, N. J.
James R. Withrow, Ohio State University, Columbus, Ohio.
John Frank Wright, Geological Survey, Ottawa, Canada.
Walter J. Yeaton, 509 Washington Blvd., Urbana, Ill.

PROCEEDINGS OF SOCIETIES

NEW ENGLAND INTERCOLLEGIATE GEOLOGICAL EXCURSION

As reported in *Science* of November 12, 1920, the Sixteenth Annual New England Intercollegiate Geological Excursion was taken in the vicinity of Middletown, Connecticut on October 8th and 9th. The pegmatite dikes at Collins Hill, Portland, were visited, and the party was fortunate in collecting, among other minerals, excellent transparent purple apatite crystals. At an evening meeting at Wesleyan University, Professor Foye exhibited a collection of the minerals from the pegmatite dikes.

NEWARK MINERALOGICAL SOCIETY

Meeting of Sunday, December 5th, 1920

At the December meeting Dr. Colton, being present, was requested to preside and called the meeting to order with twelve members present. One application was favorably acted upon. The Secretary and Treasurer were informed that an appropriation of \$5.00 had been made to each in appreciation of their past efforts in behalf of the Club, this amount to be used in purchasing a specimen for their collections. An appropriation of \$10.00 for specimens to be added to the School collection was also made. Mr. P. Walther then read a paper on the topic of the meeting, "Pseudomorphs." It was announced that at the January meeting Mr. Charles Hoadley will read a paper on "Eastern Localities," and Mr. Wm. H. Broadwell will demonstrate the making of cardboard trays for specimens.

WM. H. BROADWELL, *Secretary*

PHILADELPHIA MINERALOGICAL SOCIETY

Wagner Free Institute of Science, December 9, 1920

A stated meeting of the Philadelphia Mineralogical Society was held on the above date with the president, Dr. Hawkins, in the chair. Fifteen members and six visitors were present.

Dr. J. Volney Lewis addressed the society on "Notes on the zeolites." The older theories ascribing their origin to weathering processes were reviewed. In northern New Jersey, zeolites occur locally in the Palisade diabase sill, and in the basalt of First Watchung Mountain, being quite absent in the other diabases and later basalt flows. They usually occur in well defined fissures, shear zones (often brecciated), or in the glassy breccias about pillow lavas, or forming amygdulæ in the latter. Attention was called to the presence of B and F in datolite and apophyllite, and to B, F, and Cl in minerals often developed by the contact metamorphism of shale by intrusive masses of diabase. It was concluded that the zeolites were deposited by solutions emanating from diabase during the last stages of cooling. The talk was illustrated with many interesting slides.

Mr. Hoadley called attention to the occurrence of stilbite and harmotome in the schists of New York. Mr. Gordon remarked that zeolites are frequently found occupying shear zones in granite and diorite gneisses in southeastern Pennsylvania, probably having been deposited by solutions emanating from pegmatites, with which some of the zeolites may be rarely observed. Dr. Hawkins described an occurrence of analcite, natrolite, ilmenite and brookite in a brecciated zone in shale distant from any diabase, near Princeton, N. J. Mr. Frederick Hilbiber exhibited chabazite, stilbite, and heulandite from Perkiomenville, Penna., which were found in veins in the hornfels adjacent to a diabase intrusive.

A rising vote of thanks was tendered to Dr. Lewis for his interesting communication.

SAMUEL G. GORDON, *Secretary*

NEW YORK MINERALOGICAL CLUB

The Regular Monthly Meeting of the New York Mineralogical Club was held in the Assembly Room of the American Museum of Natural History on the evening of December 15, at 8.15 P.M. The Vice-President, Mr. George E. Ashby, presided, and there was an attendance of 17 members.

The minutes of the last meeting were read and approved. The following were elected to membership: Mr. Harold E. Walsh, Mr. Chas. P. Curtis, Mr. B. Halpren, and Mr. R. S. Newshan.

The chairman introduced the speaker of the evening, Dr. George I. Finlay of New York University, who read a paper on "The Minerals of the Pike's Peak Region."

Dr. Finlay spoke of the excellent representation of these mineral occurrences in the collection of the American Museum, some examples of which were used to illustrate his paper. In discussing the topography of the district, which he illustrated by lantern slides of maps and views, Dr. Finlay limited the area discussed to 25 kilometers (16 miles) in radius from Pike's Peak. He described Pike's Peak as lying in a granite range overlaid by about 3,000 meters of sedi-

mentary rocks which have been eroded away. Columbite occurs in the granitic gravels. The intrusive riebeckite granite of the St. Peter's Dome region is characterized by many dikes which afford the rare fluoride minerals, which were discussed later. Gypsum crystals were found in the shales around Manitou and silicified wood to the east of Colorado Springs. In the Garden of the Gods to the south of Cripple Creek, celestite was formerly obtained and the Gorge of the Arkansas River further to the south is the dumortierite locality. Occasionally topaz occurs on the slopes of Pike's Peak in the granite area. Cripple Creek which was the scene of a Miocene volcano is famous for the gold and silver tellurides which here occur associated with fluorite.

Passing to the description of the notable minerals of the section Dr. Finlay spoke at length on the microcline (amazonite), albite and smoky quartz of Pike's Peak and the neighboring region. Among the St. Peter's Dome minerals he described cryolite, pachnolite, thomsenolite, gearksutite, astrophyllite, columbite, tysonite and ralstonite. He mentioned the topaz crystals from the Crystal Peak region and spoke of the smoky quartz as especially interesting crystallographically. These latter occur with microcline, sometimes with albite; and occasionally the rare mineral phenacite also occurs on the quartz and with microcline. The microcline crystals are twinned according to the Baveno law.

Mr. Wintringham asked the speaker regarding the roughness of certain planes on the topaz, as to whether this was due to growth or to etching; he also spoke of the luminescence of quartz pebbles and of limestone containing fluorine.

On a motion by the Recording Secretary a vote of thanks was tendered to Dr. Finlay for his interesting and valuable paper. The meeting was adjourned at 9.20 P.M.

HERBERT P. WHITLOCK, *Recording Secretary*

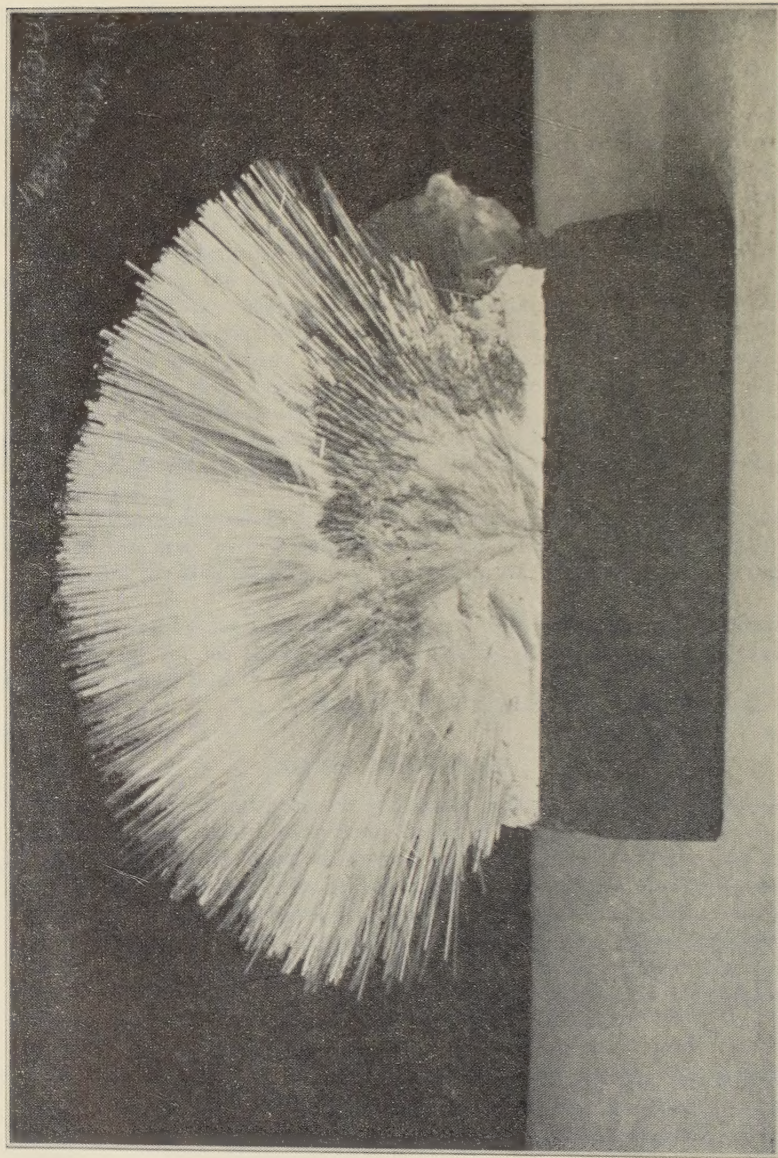
NOTES AND NEWS

The National Research Council announces that an Alloys Research Association has been formed, the primary object of which is to furnish "An informational service concerned with metals and their alloys." It proposes to supply to those applying for it, (1) information as to current literature, discoveries, etc. and (2) references and abstracts of all known information upon a given subject. This is of interest to mineralogists and crystallographers because many of the properties of metals are related to their crystal structure [altho this is not mentioned in a list of over 40 properties and phenomena which the Association has tabulated as important].

The Museums Journal reports that on October 16th, 1920, the Buffalo Society of Natural Sciences opened a new museum, at 1231 Elmwood Avenue. Included among the many exhibits are two cases of precious and semi-precious stones.

We regret to learn that Mr. George L. English of Ward's Natural Science Establishment, has been seriously ill; but we trust that by the time this reaches our readers he will be well on the road to recovery.

PLATE 2



NATROLITE, WEST PATERSON, N. J.
Florence P. Manchester Memorial Collection, Fall River, Mass.

($\times \frac{2}{3}$)